

**REMARKS/ARGUMENTS**

This reply is fully responsive to the Office Action dated 22 DECEMBER 2006, and is filed within four - (4) months following the mailing date of the Office Action. The  
5 Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed. The method of payment and fees for petition fee due in connection therewith is enclosed.

10 **Disclosure/Claims Status Summary:**

This application has been carefully reviewed in light of the Office Action of December 22, 2006, wherein:

- 15 A. The Applicant's claim for priority to Provisional US Application No. 60/418,044 filed on 12 October 2002 was acknowledged;
- B. The information disclosure statement (IDS) submitted on 27 October 2003 was found to be in compliance with the provisions of 37 CFR 1.97;
- C. Claims 1-42 were rejected under 35 U.S.C. § 101, as being directed to non-statutory subject matter;
- 20 D. Claims 1-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sangiovanni-Vincentelli, in view of the Applicant's own admission; and
- E. Claims 1-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang et al., in view of the Applicant's own admission.

25 Please note that, in order to facilitate the reading of this Office Action Response, **all the statements submitted by the Applicants have been indented while the Examiner's statements (presented in the Office Action dated 22 DECEMBER 2006) are not indented.**

30 **Claim Rejections - 35 U.S.C. § 101**

In section 4 of the current Office Action, the Examiner rejected Claims 1-42 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. The Examiner stated that the claimed invention as a whole must accomplish a practical application, and that it must produce a “useful, concrete and tangible result.” See *State Street* 149 F.3d at 1373, 47 USPQ2d at 1601-02. The Examiner further stated that a process that consists solely of the manipulation of an abstract idea is not concrete or tangibles. See *In re Warmerdam*, 33 F.3d 1354, 1360, 31 USPQ2d 1754, 1759 (Fed.Cir. 1994). See also *Schrader*, 22 F.3d at 295, 30 USPQ2d at 1459.

Specifically, the Examiner stated that Claims 1-42 recite the steps of generating, selecting, and applying a model, and that as such, the claims do not produce a useful, concrete, and tangible result. The Examiner further stated that Claims 1-42 are directed to a series of abstract mathematical steps such as generating matrices, selecting wavelets, and iteratively applying models, and as such, the claims do not produce a useful, concrete, and tangible result.

In addition, the Examiner stated that Claims 29-42 appear to recite a computer program, and that it should be noted that code (i.e., a computer software program) does not do anything per se, and that instead, it is the code stored on a computer that, when executed, instructs the computer to perform various functions. The Examiner further stated that the following claim is a generic example of a proper computer program product claim, “a computer program product embodied on a computer-readable medium and comprising code that, when executed, causes a computer to perform the following: Function A; Function B; Function C; and so on.”

**Regarding the rejection of base Claims 1, 15, and 29 as being directed to non-statutory subject matter**

**The Applicants respectfully submit that Claims 1, 15, and 29 are directed toward a practical application.** The Applicants submit that the Federal Circuit court stated that a claim is limited to a practical application

when the method, as claimed, produces a concrete, tangible and useful result. *AT&T v. Excel Communications, Inc.*, 172 F.3d at 1358. The Applicants submit that Claims 1, 15, and 29 recite a method, an apparatus, and a computer program product, respectively, for simulating a mixed-signal system by iteratively applying the wavelet model over a series of clock cycles to develop a behavioral model of the system. **Thus, these claims are directed toward a method, an apparatus, and a computer program product that produce a concrete, tangible and useful result, i.e. the result being the behavioral model of the system.**

Specifically, Claims 1, 15, and 29 comprise the act of (means for) “generating a matrix-based wavelet operator representation of equations characterizing a system, with the matrix-based wavelet operator representation including wavelet connection coefficients; selecting a number of wavelets and a set of wavelet basis functions with which to represent a performance of the system, whereby the wavelet operator, the number of wavelets and the set of wavelet basis functions represent a wavelet model of the system; and iteratively applying the wavelet model over a series of clock cycles to develop a behavioral model of the system.”

Furthermore, the Applicants submit that the behavioral model of the system (developed by the base Claims 1, 15, and 29) can be used to simulate the performance of a wide variety of systems, non-limiting examples of which include mechanical and electrical systems (referring to page 9 line 60 to page 10 line 1 of the present invention). In particular, **the Applicants emphasize that the behavioral model of the system has application to the next generation of computer aided design (CAD) software for circuit design and analysis, which is a useful and concrete practical application** (referring to the next generation of computer aided

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design) for this useful, concrete, and tangible behavioral model of a system (referring to page 10 lines 4 to 7 of the present invention).

**The Applicants further note that, as required by § 101, the present invention manipulates data representing physical objects (i.e., matrix-based wavelet operator representation of equations characterizing a system). Additionally, the present invention performs activities to achieve a practical application (i.e., simulating a mixed-signal system by developing a behavioral model of a system to be used on the next generation of computer aided design (CAD) software for circuit design and analysis.**

**Furthermore, the Applicants submit that the present invention does not merely manipulate abstract ideas, nor does it solve a purely mathematical problem without any limitation to a practical application. On the contrary, the Applicants submit that the present invention develops a behavioral model of a real, tangible, and concrete system, which is not an abstract system or idea. In addition, Claims 1-42 recite the steps of generating, selecting, and iteratively applying a wavelet model over a series of clock cycles to develop a behavioral model of the system, and the Applicants submit that these steps are not a purely mathematical problem since these steps generate a useful, tangible, and concrete behavioral model that is used on several practical applications, such as the generation of computer aided design (CAD) software for circuit design and analysis.**

For at least the reasons given above, the Applicants respectfully submit that base Claims 1, 15, and 29 are directed toward a practical application that produces a concrete, tangible, and useful result (a behavioral model of the system); that Claims 1, 15, and 29 comprise means that results in a

limitation to a practical application; that the present invention manipulates data representing physical objects (matrix-based wavelet operator representation of equations characterizing a system) or activities to achieve a practical application (simulating a mixed-signal system to be used on the next generation of CAD software); that the present invention does not merely manipulate abstract ideas; and that the present invention, as claimed in base Claims 1, 15, and 29, does not solve a purely mathematical problem without any limitation to a practical application.

Therefore, the Applicants submit that base Claims 1, 15, and 29 are directed to statutory subject matter within the meaning of 35 U.S.C. § 101 and the Applicants respectfully request that the rejection of base Claims 1, 15, and 29 under 35 U.S.C. § 101 be withdrawn.

Furthermore, the Applicants submit that Claims 2-14 are dependent upon Claim 1, Claims 16-28 are dependent upon Claim 15, and Claims 30-42 are dependent upon Claim 29. For at least the reasons given above, the Applicants submit that Claims 1, 15, and 29 are directed to statutory subject matter within the meaning of 35 U.S.C. § 101. Therefore, in addition to the reasons set forth above, the Applicants submit that Claims 2-14, 16-28, and 30-42 are also directed to statutory subject matter within the meaning of 35 U.S.C. § 101 at least based on their dependence upon an allowable base claim.

**Regarding the Examiner's statement that Claims 29-42 appear to recite code that does not do anything per se**

Regarding the Examiner's statement that "Claims 29-42 appear to recite a computer program, and that it should be noted that code (i.e., a computer software program) does not do anything per se, and that instead, it is the code stored on a computer that, when executed, instructs the computer to perform various functions," **the Applicants submit that the**

**MPEP list the following claim formats which are acceptable and not subject to 101 rejection, “a computer program embodied in a computer readable medium for performing the steps of ...”, and “a computer readable medium storing a program for performing the steps of...”** *See* MPEP 2106.

**The Applicants respectfully submit that Claims 29-42 of the present invention refer to a “computer program product” and do not merely refer to a “computer program” as stated by the Examiner.**

Specifically, Claims 29-42 refer to “a computer program product comprising a computer-readable medium for use in a computer system with the computer program product having computer readable means,” as clearly stated on the preamble of Claims 29-42. The Applicants submit that this preamble fits the claim formats listed by the MPEP which are not subject to a rejection under 35 U.S.C. § 101. *See* MPEP 2106.

Furthermore, regarding the Examiner’s statement that “it is the code stored on a computer that, when executed, instructs the computer to perform various functions,” **the Applicants submit that the Federal Court grants functional equivalence to the following functional language disclosed in base Claim 29:** means for generating; means for selecting; and means for iteratively applying. That is, the Applicants submit that as “functional language” the limitation “means for generating” has the functional equivalency of a “generator,” the limitation “means for selecting” has the functional equivalency of a “selector,” and so forth. Therefore, the Applicants submit that the computer program product comprising the plurality of means previously stated, is not required to be executed by a processor or computer in order to be functional and in order not to just be merely descriptive material.

Therefore, for at least the reasons given above, the Applicants submit that Claims 29-42 as written are directed to statutory subject matter within the meaning of 35 U.S.C. § 101 and the Applicants respectfully request that the rejection of Claims 29-42 under 35 U.S.C. § 101 be withdrawn.

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**Claim Rejections - 35 U.S.C. § 103(a)**

**Examiner's rejections of Claims 1-42 over the Sangiovanni publication, in view of the Applicants' own admission**

In section 5 of the current Office Action, the Examiner rejected Claims 1-42 under 35 U.S.C. § 103(a) as being unpatentable over Sangiovanni-Vincentelli, "Design Methodologies for Analog and RF integrated circuits," final report for the MICRO Project 99-105 for the University of California (hereinafter referred to as the "Sangiovanni publication"), in view of the Applicants' own admission.

15 **With respect to the "Applicants' own admission,"** the Examiner stated that paragraphs 6 (emphasizing lines 5- 6) and 7 (emphasizing lines 4-9 and the last 3 lines) of the background section of the present invention stated the following:

[0006] Mixed-signal circuits, an example of which is the delta-sigma modulator, include both analog and digital functionality on the same chip and are difficult to simulate with conventional CAD software, such as SPICE or Simulink, for three main reasons: (1) they are described by a large number of equations; (2) the equations involve highly discontinuous non-linear operations at the clock period of the digital circuit; and (3) the equations are currently solved using slow, time-marching, algorithms (Runge-Kutta type).

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[0007] Recently, several approaches to fast simulation of mixed-signal circuits have been presented. Several are listed in the set of references below and are described here.

Opal et al. presented a basic approach for circuits with a clock period in which linear differential equations are solved by one matrix multiply per clock cycle. In their method, a strong nonlinearity, such as the quantizer in a delta-sigma modulator, is simulated with a behavioral model at each clock period. Schreier and Zhang use a similar approach to construct recursion relations that update state variables of a delta-sigma modulator from time  $t$  to time  $t+T_c$ , where  $T_c$  represents the clock period. Cherry and Snelgrove compare three approaches: the recursion relation or direct integration approach, the time-marching method, and a z-domain extraction procedure, which were intended to combine the speed of the recurrence relations with the versatility of the time-marching method. Zhou et al., and Meliopoulos and Lee, have considered wavelet methods for use in general nonlinear circuit simulation and transient analysis.

**Claim 1 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses behavioral modeling of mixed-signal systems in Section I, performance analysis in Section II, and the use of a Galerkin procedure, connection coefficients, and system equations in Sections IV-A to IV-B. The Examiner further stated that the Sangiovanni publication does not explicitly disclose the use of wavelets or applying a model over a series of clock cycles, and that the "Applicants' own admission" (referring to background section of present invention, Paragraphs [0006] and [0007]) discloses the use of wavelets to characterize a system (referring to last three lines of paragraph [0007], "Zhou et al.,



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and Meliopoulos and Lee, have considered wavelet methods for use in general nonlinear circuit simulation and transient analysis”), as well as iteratively applying a model over a series of clock cycles to develop a behavioral model of a system (referring to Paragraph [0007] Lines 4-9), as well as independent selection for iteration  
5 which can be performed by SPICE/Simulink (referring to Paragraph [0006] Lines 5-6, and Paragraph [0007] Lines 4-9).

The Examiner stated that the “Applicants’ own admission” ( referring to Paragraph [0006], Lines 5-6 and Paragraph [0007], Lines 4-9 and the last three lines) and the  
10 Sangiovanni publication are analogous art in that they deal with design/simulation of mixed-signal systems. Then, the Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the wavelet and modeling methodologies discussed in the “Applicants’ own admission” (referring to background section of present invention, Paragraphs [0006] and [0007]) for the  
15 design/simulation methodologies in the Sangiovanni publication in order to allow for more “efficient system-level design methodologies” and the evaluation/design/simulation of mixed-signal circuits as discussed in the Abstract of the Sangiovanni publication.

20 **Regarding the rejection of Claim 1 over the Sangiovanni publication, in view of the Applicants’ own admission**

- The Applicants submit that the Federal Circuit court stated that “**The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the**  
25 **prior art suggested the desirability of the modification.”** *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)). Furthermore, the MPEP 706.02(j) states that the teaching or suggestion to make the claimed combination ... **must be found in the prior art**

**and not based on applicant's own disclosure.** *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Specifically, regarding the "Applicants' own admission" (referring to background section of present invention, Paragraphs [0006] and [0007]),  
5 **the Applicants submit that the Examiner is attempting to combine the Sangiovanni publication with four prior art references based on the Applicant's own disclosure, wherein these four references correspond to Opal et al. (referring to paragraph [0007] line 4 of the Applicant's own disclosure), Schreier and Zhang (referring to paragraph [0007] line 9 of the Applicant's own disclosure), Zhou et al. (referring to paragraph [0007] line 17 of the Applicant's own disclosure), and Meliopoulos and Lee (referring to paragraph [0007] lines 17-18 of the Applicant's own disclosure).**

15 The Applicants submit that **the Examiner presented the following statement, as the motivation to combine the Sangiovanni publication with the references presented on the Applicant's own disclosure:**  
"Applicants' own admission and the Sangiovanni publication are analogous art in that they deal with design/simulation of mixed-signal systems."  
20 **Therefore, the Applicants respectfully remind the Examiner that the motivation to combine the prior art must not be found based on the Applicant's own disclosure, since the Federal Circuit Court stated that the teaching or suggestion to make the claimed combination ... must be found in the prior art and not based on applicant's own disclosure.**  
25 *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

The Applicants further emphasize that the prior art references do not contain any suggestion or motivation, express or implied, that they be  
30 combined. Therefore, the teachings of the references are not sufficient to

render the independent Claims 1, 15, and 29 *prima facie* obvious, since the MPEP 706.02(j) states that the teaching or suggestion to make the claimed combination ... must be found in the prior art and not based on applicant's own disclosure. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). The Applicants are unaware where in either the Sangiovanni publication, the Opal et al. reference, the Schreier and Zhang reference, the Zhou et al. reference or the Meliopoulos and Lee reference, it is taught, disclosed, or suggested to utilize the wavelet and modeling methodologies discussed in the Opal et al., the Schreier and Zhang, the Zhou et al., and the Meliopoulos and Lee references, for the design/simulation methodologies in the Sangiovanni publication in order to allow for more "efficient system-level design methodologies" and the evaluation / design / simulation of mixed-signal circuits as discussed in the Abstract of the Sangiovanni publication. The Applicants respectfully request that the Examiner indicate exactly where (page number, paragraph number, and line numbers), in each of the prior art references, the Examiner found the motivation to combine the references. Furthermore, the Applicants respectfully remind the Examiner that "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)).

- The Applicants further submit that "It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *Id.* at 1266, 23 USPQ2d at 1784, Appeal No. 1998-1472 Page 13 Application No. 08/427,721 (citing *In re Gorman*, 933 F.2d

982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991)). The Applicants further submit that the MPEP states that “**The Examiner ordinarily should reject each claim on all valid grounds available, avoiding, however, undue multiplication of references.**” See MPEP § 707.079(g) and MPEP § 904.03.

Therefore, the Applicants respectfully note that combining the prior art of the Sangiovanni publication with three or more prior art references in order to reject the independent Claim 1 is clear evidence of the non-obviousness of Claim 1. Therefore, the Applicants believe that a clear evidence of the non-obviousness of an invention is shown when a multiplicity of references, usually over three references, must be combined in order to meet the claimed invention. Thus, the Applicants submit that it is clear evidence of the non-obviousness of the present invention that a total of five references must be combined in order to meet the claimed invention recited on the independent Claim 1. For the foregoing reasons the Applicants respectfully believe that Claim 1, as written, is patentable over the excessive combination of prior art references and respectfully request that this rejection of Claim 1 under 35 U.S.C. §103(a) be withdrawn.

- The Applicants submit that The CCPA stated that under 35 U.S.C. § 103(a), “In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination or other modification.” *In re Lintner*, 458 F.2d 1013 (C.C.P.A. 1972). Further, the CCPA has subsequently added that the prima facie case requires that the reference teachings

**“appear to have suggested the claimed subject matter.”** *In re Rinehart*,  
531 F.2d 1048 (C.C.P.A. 1976).

The Applicants submit that, in contrast to the present invention, the  
5 combination of the Sangiovanni publication with the four references cited  
on the Applicants’ own disclosure does not teach all of the limitations of  
Claim 1. Specifically, the Applicants assert that the combination does not  
teach, disclose, or suggest “generating a matrix-based wavelet operator  
representation of equations characterizing a system, with the matrix-based  
10 wavelet operator including wavelet connection coefficients; and iteratively  
applying the wavelet model over a series of clock cycles to develop a  
behavioral model of the system,” as is claimed in Claim 1.

The Applicants submit that the Examiner stated that the Sangiovanni  
15 publication discloses, on sections IV-A to IV-B, “the connection  
coefficients” as taught by the present invention. However, the Applicants  
did not find any “connection coefficients” equivalent to the “wavelet  
connection coefficients of Claim 1,” in sections IV-A to IV-B of the  
Sangiovanni publication. **Thus, the Applicants request that the**  
20 **Examiner please indicate exactly where (page number, column**  
**number, and line number) in the Sangiovanni publication the**  
**Examiner finds “the connection coefficients” as taught by the present**  
**invention.**

Furthermore, the Examiner stated that the Sangiovanni publication **does**  
25 **not explicitly disclose the use of wavelets or applying a model over a**  
**series of clock cycles, but that the “Applicants’ own admission”**  
**discloses the use of wavelets to characterize a system** (referring the  
Zhou et al. reference, and the Meliopoulos and Lee reference), as  
30 well as iteratively applying a model over a series of clock cycles to

develop a behavioral model of a system (referring to the Opal et al. reference), as well as independent selection for iteration which can be performed by SPICE/Simulink.

5       The Applicants submit that **prior to the method disclosed by the present invention, wavelet techniques could not be applied to mixed-signal circuits because of the number of wavelets required for time simulation**, over an entire time interval of  $2^{14}$  or more clock periods needed for analyzing mixed-signal circuits, **made using wavelet techniques unsuitable to simulate a mixed-signal system in real-time** (referring to page 2 paragraph [0012]).

15       **The Applicants further submit that the method disclosed by Claim 1 overcomes the problems associated with the techniques cited by the Examiner (referring to the Opal et al. reference, and the Zhou et al. reference, and the Meliopoulos and Lee reference).** The Applicants further submit that the method disclosed by Claim 1 is sufficiently general to solve realistic circuit problems while being easy to derive and sparse in general, in contrast with the Opal et al. reference. Furthermore, the

20       Applicants submit that the method disclosed by Claim 1 solves the problem encountered by the wavelet techniques considered by the Zhou et al. reference, and the Meliopoulos and Lee reference, which could not be applied to mixed-signal circuits because of the number of wavelets required for time simulation over an entire time interval of  $2^{14}$  or more clock

25       periods needed for analyzing mixed-signal circuits (referring to page 2 paragraph [0012] and page 10 paragraph [0061]).

In addition, because Applicants are unaware where in the cited prior art the Examiner believes that “generating a matrix-based wavelet operator representation of equations characterizing a system, including wavelet

connection coefficients” is taught, disclosed or suggested, Applicants are further unaware where in the cited prior art the Examiner believes that “iteratively applying the wavelet model over a series of clock cycles to develop a behavioral model of the system,” as is claimed in Claim 1, is taught, disclosed or suggested. Therefore, Applicants respectfully request that the Examiner point out where in the cited prior art the Examiner believes that these limitations are taught, disclosed or suggested.

Further, the Applicants submit that the limitations discussed above are not taught, disclosed or suggested as exactly claimed in Claim 1 by either the Sangiovanni publication, or the Opal et al. reference, or the Schreier and Zhang reference, or the Zhou et al. reference (referring to the background section of the present invention). And given that the Applicants are unclear where in the cited prior art the Examiner believes each and every element of Claim 1 is taught, disclosed, or suggested, the Applicants submit that Claim 1 contains patentable subject matter and should be allowed.

Therefore, the Applicants submit that the Sangiovanni publication, in combination with the prior art disclosed on the background section of the present invention, and with the knowledge of one skilled in the art, does not teach, disclose, or suggest all of the limitations of Claim 1.

- In addition, **the Applicants submit that the present invention provides a solution to an unsolved need in a crowded art, and as such, the present invention should be regarded as significant and thus, non-obvious.** The present invention is classified in the crowded art of techniques for simulation of mixed-signal systems. Specifically the present invention relates to a technique for using a wavelet operator to

simulate the performance of mixed-signal circuits (referring to the present invention page 1 lines 9-10).

In the crowded art of mixed-signal system simulation and modeling, there are several methods to create a behavioral model for a mixed-signal system. However these existing techniques suffer from several problems that the present invention overcomes. For example (referring to page 2 paragraph [0012] of the present invention), the matrix operator and direct integration methods, taught by the Opal et al. and the Schreier and Zhang references, are **not sufficiently general to solve realistic circuit problems**, and the matrix in the matrix method is **difficult to derive and is not small or sparse in general**. The time-marching method, taught by the Cherry and Snelgrove reference, is **slow**, and the z-domain extraction procedure, taught by the Cherry and Snelgrove reference, is **difficult to generalize for real circuits**. In addition, the wavelet techniques considered by the Zhou et al., and Meliopoulos and Lee references, **cannot be applied to mixed-signal circuits because of the number of wavelets required for time simulation over an entire time interval of  $2^{14}$  or more clock periods needed for analyzing mixed-signal circuits**. In contrast, the Applicants submit that the present invention provides a technique in which a system simulation is broken up into clock periods, and the calculation within each clock period, which is weakly non-linear, is performed by matrix multiplication. The Applicants further submit that the entire simulation can be performed by repeating this process for the required number of clock periods, and that since the technique disclosed in Claim 1 is much faster than time-marching algorithms that require small time steps to simulate the discontinuous non-linearity, a much larger number of equations can be simulated in reasonable computer run times. (referring to page 10 paragraph [0061] of the present invention).



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For the foregoing reasons the Applicants respectfully believe that the present invention provides a solution to an unsolved need in a crowded art, and as such, the present invention should be regarded as significant and thus, non-obvious.

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- For the foregoing reasons the Applicants respectfully submit that Claim 1, as written, is patentable over the combination of prior art references and respectfully request that this rejection of Claim 1 under 35 U.S.C. §103(a) be withdrawn.

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**Claim 2 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication (referring to the Abstract) discloses a method for simulating a mixed-signal system as set forth in Claim 1, where the system is an electrical circuit.

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**Regarding the rejection of Claim 2 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claim 2, the Applicants refer the Examiner to page 38 of this response.

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**Claim 3 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 2, where the electrical circuit is a delta-sigma modulator (referring to the "DSM," a type of mixed signal system, discussed in the Abstract of the Sangionvanni publication).

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**Regarding the rejection of Claim 3 over the Sangiovanni publication, in view of the Applicants' own admission**

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Regarding Claim 3, the Applicants refer the Examiner to page 38 of this response.

**Claim 4 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 3, wherein in the generating act, the matrix-based wavelet operator is developed by a wavelet-Galerkin method (referring to Galerkin procedure, connection coefficients, and system equations in Sections IV-A to IV-B).

**Regarding the rejection of Claim 4 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claim 4, the Applicants refer the Examiner to page 38 of this response.

**Claim 5 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 4, wherein in the generating act, the matrix-based wavelet operator is developed directly from a system diagram or from equations that describe the system (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 5 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claim 5, the Applicants refer the Examiner to page 38 of this response.

**Claim 6 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 5, wherein in the selecting act  
5 the number of wavelets is selected independently for each iteration of the acts of the method (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 6 over the Sangiovanni publication, in view of the Applicants' own admission**

10           Regarding Claim 6, the Applicants refer the Examiner to page 38 of this response.

**Claim 7 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

15           In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 6, wherein in the selecting act, the set of wavelet basis functions is selected independently for each iteration of the acts of the method (referring to Section I, Section II, and Sections IV-A to IV-B).

20           **Regarding the rejection of Claim 7 over the Sangiovanni publication, in view of the Applicants' own admission**

              Regarding Claim 7, the Applicants refer the Examiner to page 38 of this response.

25           **Claim 8 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

              In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 7, further comprising acts of receiving a specification for a system model and outputting the behavioral model of the  
30           system (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 8 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claim 8, the Applicants refer the Examiner to page 38 of this response.

**Claim 9 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the generating act, the matrix-based wavelet operator is developed by a wavelet-Galerkin method (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 9 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claim 9, the Applicants refer the Examiner to page 38 of this response.

**Claim 10 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the generating act, the matrix-based wavelet operator is developed directly from a system diagram (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 10 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claim 10, the Applicants refer the Examiner to page 38 of this response.

**Claim 11 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the generating  
5 act, the matrix-based wavelet operator is developed directly from equations that describe the system (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 11 over the Sangiovanni publication, in view of the Applicants' own admission**

10           Regarding Claim 11, the Applicants refer the Examiner to page 38 of this response.

**Claim 12 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

15           In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the selecting act the number of wavelets is selected independently for each iteration of the acts of the method (referring to Section I, Section II, and Sections IV-A to IV-B).

20           **Regarding the rejection of Claim 12 over the Sangiovanni publication, in view of the Applicants' own admission**

              Regarding Claim 12, the Applicants refer the Examiner to page 38 of this response.

25           **Claim 13 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

              In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the selecting act, the set of wavelet basis functions is selected independently for each iteration of the acts  
30 of the method (referring to Section I, Section II, and Sections IV-A to IV-B).

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**Regarding the rejection of Claim 13 over the Sangiovanni publication, in view of the Applicants' own admission**

5           Regarding Claim 13, the Applicants refer the Examiner to page 38 of this response.

**Claim 14 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

10       In particular, the Examiner stated that the Sangiovanni publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, further comprising acts of receiving a specification for a system model and outputting the behavioral model of the system (referring to Section I, Section II, and Sections IV-A to IV-B).

**Regarding the rejection of Claim 14 over the Sangiovanni publication, in view of the Applicants' own admission**

15           Regarding Claim 14, the Applicants refer the Examiner to page 38 of this response.

**Claims 15-42 rejection over the Sangiovanni publication, in view of the Applicants' own admission**

20       The Examiner stated that regarding Claims 15-42, the Examiner refers the Applicants to the citations and rejections presented above for Claims 1-14.

**Regarding the rejection of Claims 15 and 29 over the Sangiovanni publication, in view of the Applicants' own admission**

25           Regarding the independent Claims 15 and 29, the Applicants refer the Examiner to the comments above regarding Claim 1, specifically to pages 10 to 18 of this response. Since independent Claims 15 and 29 disclose similar limitations to Claim 1, the Applicants submit that Claims 15 and  
30           29 are also patentable over the cited prior art at least based on the reasons

given above regarding Claim 1. For the foregoing reasons the Applicants respectfully submit believe that Claims 15 and 29, as written, are patentable over the combination of prior art references and respectfully request that this rejection of Claims 15 and 29 under 35 U.S.C. §103(a) be withdrawn.

**Regarding the rejection of Claims 16-28 and 30-42 over the Sangiovanni publication, in view of the Applicants' own admission**

Regarding Claims 16-28 and 30-42, the Applicants refer the Examiner to page 38 of this response.

**Claim Rejections - 35 U.S.C. § 103(a)**

**Examiner's rejections of Claims 1-42 over the Chang publication, in view of the Applicants' own admission**

In section 6 of the current Office Action, the Examiner rejected Claims 1-42 under 35 U.S.C. § 103(a) as being unpatentable over Chang et al., "Wavelet-Based Galerkin Method for Semiconductor Devices Simulation," Proceedings of the 1998 IEEE International Symposium on Circuits and Systems, Vol. 6, Issue 31, May to June 1998, pages 417-420 (hereinafter referred to as "the Chang publication"), in view of the Applicants' own admission.

**Claim 1 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses utilizing a wavelet-based Galerkin method for simulation of semiconductor devices (referring to the Abstract, the Introduction, Section 3, and Section 5 of the Chang publication). The Examiner further stated that the Chang publication does not explicitly disclose the use of clock cycles for iteration of the model, and that the "Applicants' own admission" (referring to background section of present invention, Paragraphs [0006] and [0007]) discloses the use of wavelets to characterize a system (referring to last three lines of

paragraph [0007]), “Zhou et al., and Meliopoulos and Lee, have considered wavelet methods for use in general nonlinear circuit simulation and transient analysis”), as well as iteratively applying a model over a series of clock cycles to develop a behavioral model of a system (referring to Paragraph [0007] Lines 4-9), as  
5 well as independent selection for iteration which can be performed by SPICE/Simulink (referring to Paragraph [0006] Lines 5-6, and Paragraph [0007] Lines 4-9).

The Examiner stated that the “Applicants’ own admission” ( referring to Paragraph [0006], Lines 5-6 and Paragraph [0007], Lines 4-9 and the last three lines) and the Chang  
10 publication are analogous art in that they deal with design/simulation of mixed-signal systems/semiconductor devices. Then, the Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the wavelet and modeling methodologies discussed in the “Applicants’ own admission” ( referring to Paragraph [0006], Lines 5-6 and Paragraph [0007], Lines 4-9 and the last  
15 three lines) for the design/simulation methodologies taught by the Chang publication, in order to save computation time and provide for a more accurate result in the evaluation/design/simulation of semiconductor devices as discussed in the Abstract of the Chang publication.

20 **Regarding the rejection of Claim 1 over the Chang publication, in view of the Applicants’ own admission**

- The Applicants submit that the Federal Circuit court stated that “**The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the**  
25 **prior art suggested the desirability of the modification.”** *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)). Furthermore, the MPEP 706.02(j) states that the teaching or suggestion to make the claimed combination ... **must be found in the prior art**



**and not based on applicant's own disclosure.** *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Specifically, regarding the "Applicants' own admission" (referring to background section of present invention, Paragraphs [0006] and [0007]),  
5        **the Applicants submit that the Examiner is attempting to combine the Chang publication with four prior art references based on the Applicant's own disclosure**, wherein these four references correspond to Opal et al. (referring to paragraph [0007] line 4 of the Applicant's  
10        own disclosure), Schreier and Zhang (referring to paragraph [0007] line 9 of the Applicant's own disclosure), Zhou et al. (referring to paragraph [0007] line 17 of the Applicant's own disclosure), and Meliopoulos and Lee (referring to paragraph [0007] lines 17-18 of the Applicant's own disclosure).

15        The Applicants submit that **the Examiner presented the following statement, as the motivation to combine** the Chang publication with the references presented on the Applicant's own disclosure: "Applicants' own admission and the Chang publication are analogous art in that they deal  
20        with design/simulation of mixed-signal systems/semiconductor devices." **Therefore, the Applicants respectfully remind the Examiner that the motivation to combine the prior art must not be found based on the Applicant's own disclosure**, since the Federal Circuit Court stated that **the teaching or suggestion to make the claimed combination ... must**  
25        **be found in the prior art and not based on applicant's own disclosure.** *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

As previously stated and repeated here for clarity, the Applicants  
30        **further emphasize that the prior art references do not contain any suggestion or motivation, express or implied, that they be combined.**

Therefore, the teachings of the references are not sufficient to render the independent Claims 1, 15, and 29 *prima facie* obvious, since the MPEP 706.02(j) states that the teaching or suggestion to make the claimed combination ... must be found in the prior art and not based on applicant's own disclosure. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

The Applicants are unaware where in either the Chang publication, the Opal et al. reference, the Schreier and Zhang reference, the Zhou et al. reference or the Meliopoulos and Lee reference, it is taught, disclosed, or suggested to utilize the wavelet and modeling methodologies discussed in the Opal et al., the Schreier and Zhang, the Zhou et al., and the Meliopoulos and Lee references, for the design/simulation methodologies taught by the Chang publication, in order to save computation time and provide for a more accurate result in the evaluation/design/simulation of semiconductor devices as discussed in the Abstract of the Chang publication. The Applicants respectfully request that the Examiner indicate exactly where (page number, paragraph number, and line numbers), in each of the prior art references, the Examiner found the motivation to combine the references. Furthermore, the Applicants respectfully remind the Examiner that "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)).

- The Applicants further submit that "It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *Id.* at 1266, 23 USPQ2d at 1784, Appeal No. 1998-1472 Page 13 Application No. 08/427,721 (citing *In re Gorman*, 933 F.2d

982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991)). The Applicants further submit that the MPEP states that “**The Examiner ordinarily should reject each claim on all valid grounds available, avoiding, however, undue multiplication of references.**” See MPEP § 707.079(g) and MPEP § 904.03.

Therefore, the Applicants respectfully note that combining the prior art of the Chang publication with three or more prior art references in order to reject the independent Claim 1 is clear evidence of the non-obviousness of Claim 1. Therefore, the Applicants believe that a clear evidence of the non-obviousness of an invention is shown when a multiplicity of references, usually over three references, must be combined in order to meet the claimed invention. Thus, the Applicants submit that it is clear evidence of the non-obviousness of the present invention that a total of five references must be combined in order to meet the claimed invention recited on the independent Claim 1. For the foregoing reasons the Applicants respectfully believe that Claim 1, as written, is patentable over the excessive combination of prior art references and respectfully request that this rejection of Claim 1 under 35 U.S.C. §103(a) be withdrawn.

- The Applicants submit that The CCPA stated that under 35 U.S.C. § 103(a), “In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination or other modification” *In re Lintner*, 458 F.2d 1013 (C.C.P.A. 1972). Further, the CCPA has subsequently added that the prima facie case requires that the reference teachings “**appear to have suggested the claimed subject matter.**” *In re Rinehart*, 531 F.2d 1048 (C.C.P.A. 1976).

The Applicants submit that, in contrast to the present invention, the combination of the Chang publication with the four references cited in the Applicants' own disclosure does not teach all of the limitations of Claim

5 1. Specifically, the Applicants assert that the combination does not teach, disclose, or suggest "generating a matrix-based wavelet operator representation of equations characterizing a system, with the matrix-based wavelet operator including wavelet connection coefficients; and iteratively applying the wavelet model over a series of clock cycles to develop a

10 behavioral model of the system," as is claimed in Claim 1.

The Examiner stated that the Chang publication **does not explicitly disclose the use of clock cycles for iteration of the model, but that the**

15 **"Applicants' own admission" discloses the use of wavelets to characterize a system** (referring the Zhou et al. reference, and the Meliopoulos and Lee reference), as well as iteratively applying a model over a series of clock cycles to develop a behavioral model of a system (referring to the Opal et al. reference), as well as independent selection for iteration which can be performed by SPICE/Simulink.

20 **As previously stated and repeated here for clarity, the Applicants submit that prior to method disclosed by the present invention, wavelet techniques could not be applied to mixed-signal circuits because of the number of wavelets required for time simulation, over**

25 **an entire time interval of  $2^{14}$  or more clock periods needed for analyzing mixed-signal circuits, made using wavelet techniques unsuitable to simulate a mixed-signal system in real-time (referring to page 2 paragraph [0012]). The Applicants submit that the wavelet-based Galerking Method for semiconductor devices simulation as particularly taught**

30 **by the Chang publication, requires a large number of wavelet bases**

**for each iteration** (referring to Table 1 on page VI-520), **which makes the method taught by the Chang publication unsuitable to simulate a mixed-signal system in real-time.**

5        **The Applicants further submit that the method disclosed by Claim 1 overcomes the problems associated with the techniques cited by the Examiner (referring to the Chang publication, the Opal et al. reference, and the Zhou et al. reference, and the Meliopoulos and Lee reference).** The Applicants further submit that the method disclosed  
10        by Claim 1 is sufficiently general to solve realistic circuit problems, while being easy to derive and sparse in general, in contrast with the Opal et al. reference. Furthermore, the Applicants submit that the method disclosed by Claim 1 solves the problem encountered by the wavelet techniques considered by the Zhou et al. reference, and the Meliopoulos and Lee  
15        reference, which could not be applied to mixed-signal circuits because of the number of wavelets required for time simulation over an entire time interval of  $2^{14}$  or more clock periods needed for analyzing mixed-signal circuits (referring to page 2 paragraph [0012] and page 10 paragraph [0061]).

20        Further, the Applicants submit that these limitations discussed above are not taught, disclosed or suggested as exactly claimed in Claim 1 by either the Chang publication, or the Opal et al. reference, or the Schreier and Zhang reference, or the Zhou et al. reference (referring to the background  
25        section of the present invention). And given that the Applicants are unclear where in the cited prior art the Examiner believes each and every element of Claim 1 is taught, disclosed, or suggested, the Applicants submit that Claim 1 contains patentable subject matter and should be allowed.

Therefore, the Applicants submit that the Chang publication, in combination with the prior art disclosed on the background section of the present invention, and with the knowledge of one skilled in the art, does not teach, disclose, or suggest all of the limitations of Claim 1.

5

- In addition, as previously stated and repeated here for clarity, **the Applicants submit that the present invention provides a solution to an unsolved need in a crowded art, and as such, the present invention should be regarded as significant and thus, non-obvious.** The present invention is classified in the crowded art of techniques for simulation of mixed-signal systems. Specifically the present invention relates to a technique for using a wavelet operator to simulate the performance of mixed-signal circuits (referring to the present invention page 1 lines 9-10).

10

15

**In the crowded art of mixed-signal system simulation and modeling, there are several methods to create a behavioral model for a mixed-signal system. However they have several problems that the present invention overcomes, the Applicants refer the Examiner to the comments above regarding solving the problems of previous methods and providing a solution to an unsolved need in a crowded art** (referring to pages 16-17 of this response).

20

For the foregoing reasons the Applicants respectfully believe that the present invention provides a solution to an unsolved need in a crowded art, and as such, the present invention should be regarded as significant and thus, non-obvious.

25

- For the foregoing reasons the Applicants respectfully submit believe that Claim 1, as written, is patentable over the combination of prior art

references and respectfully request that this rejection of Claim 1 under 35 U.S.C. §103(a) be withdrawn.

**Claim 2 rejection over the Chang publication, in view of the Applicants' own admission**

In particular the Examiner stated that the Chang publication (referring to the Title) discloses a method for simulating a mixed-signal system as set forth in claim 1, where the system is an electrical circuit.

**Regarding the rejection of Claim 2 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 2, the Applicants refer the Examiner to page 38 of this response.

**Claim 3 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 2, where the electrical circuit is a delta-sigma modulator (referring to a "DSM," as a type a type of semiconductor device as discussed in the Title and Abstract of the Chang publication).

**Regarding the rejection of Claim 3 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 3, the Applicants refer the Examiner to page 38 of this response.

**Claim 4 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 3, wherein in the generating

act, the matrix-based wavelet operator is developed by a wavelet-Galerkin method (referring to the Abstract, the Introduction, Section 3, and Section 5).

**Regarding the rejection of Claim 4 over the Chang publication, in view of the**

5 **Applicants' own admission**

Regarding Claim 4, the Applicants refer the Examiner to page 38 of this response.

**Claim 5 rejection over the Chang publication, in view of the Applicants' own**

10 **admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 4, wherein in the generating act, the matrix-based wavelet operator is developed directly from a system diagram or from equations that describe the system (referring to the Abstract, the Introduction, Section 3,  
15 and Section 5).

**Regarding the rejection of Claim 5 over the Chang publication, in view of the**

**Applicants' own admission**

20 Regarding Claim 5, the Applicants refer the Examiner to page 38 of this response.

**Claim 6 rejection over the Chang publication, in view of the Applicants' own**

**admission**

In particular, the Examiner stated that the Chang publication discloses a method for  
25 simulating a mixed-signal system as set forth in Claim 5, wherein in the selecting act the number of wavelets is selected independently for each iteration of the acts of the method (referring to the Abstract, the Introduction, Section 3, and Section 5).

**Regarding the rejection of Claim 6 over the Chang publication, in view of the**

30 **Applicants' own admission**



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Regarding Claim 6, the Applicants refer the Examiner to page 38 of this response.

**Claim 7 rejection over the Chang publication, in view of the Applicants' own**

5 **admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 6, wherein in the selecting act, the set of wavelet basis functions is selected independently for each iteration of the acts of the method (referring to the Abstract, the Introduction, Section 3, and Section 5).

10

**Regarding the rejection of Claim 7 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 7, the Applicants refer the Examiner to page 38 of this response.

15

**Claim 8 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 7, further comprising acts of receiving a specification for a system model and outputting the behavioral model of the system (referring to the Abstract, the Introduction, Section 3, and Section 5).

20

**Regarding the rejection of Claim 8 over the Chang publication, in view of the Applicants' own admission**

25 Regarding Claim 8, the Applicants refer the Examiner to page 38 of this response.

**Claim 9 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the generating act, the matrix-based wavelet operator is developed by a wavelet-Galerkin method (referring to the Abstract, the Introduction, Section 3, and Section 5).

5

**Regarding the rejection of Claim 9 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 9, the Applicants refer the Examiner to page 38 of this response.

10

**Claim 10 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the generating act, the matrix-based wavelet operator is developed directly from a system diagram (referring to the Abstract, the Introduction, Section 3, and Section 5).

15

**Regarding the rejection of Claim 10 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 10, the Applicants refer the Examiner to page 38 of this response.

20

**Claim 11 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the generating act, the matrix-based wavelet operator is developed directly from equations that describe the system (referring to the Abstract, the Introduction, Section 3, and Section 5).

25

**Regarding the rejection of Claim 11 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 11, the Applicants refer the Examiner to page 38 of this response.

5

**Claim 12 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the selecting act the number of wavelets is selected independently for each iteration of the acts of the method (referring to the Abstract, the Introduction, Section 3, and Section 5).

10

**Regarding the rejection of Claim 12 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 12, the Applicants refer the Examiner to page 38 of this response.

15

**Claim 13 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, wherein in the selecting act, the set of wavelet basis functions is selected independently for each iteration of the acts of the method (referring to the Abstract, the Introduction, Section 3, and Section 5).

20

**Regarding the rejection of Claim 13 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 13, the Applicants refer the Examiner to page 38 of this response.

25

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**Claim 14 rejection over the Chang publication, in view of the Applicants' own admission**

In particular, the Examiner stated that the Chang publication discloses a method for simulating a mixed-signal system as set forth in Claim 1, further comprising acts of receiving a specification for a system model and outputting the behavioral model of the system (referring to the Abstract, the Introduction, Section 3, and Section 5).

**Regarding the rejection of Claim 14 over the Chang publication, in view of the Applicants' own admission**

Regarding Claim 14, the Applicants refer the Examiner to page 38 of this response.

**Claims 15-42 rejection over the Chang publication, in view of the Applicants' own admission**

The Examiner stated that regarding Claims 15-42, the Examiner refers the Applicants to the citations and rejections presented above for Claims 1-14.

**Regarding the rejection of Claims 15 and 29 over the Chang publication, in view of the Applicants' own admission**

Regarding the independent Claims 15 and 29, the Applicants refer the Examiner to the comments above regarding Claim 1, specifically to pages 25 to 31 of this response. Since independent Claims 15 and 29 disclose similar limitations to Claim 1, the Applicants submit that Claims 15 and 29 are also patentable over the cited prior art at least based on the reasons given above regarding Claim 1. For the foregoing reasons the Applicants respectfully submit believe that Claims 15 and 29, as written, are patentable over the combination of prior art references and respectfully request that this rejection of Claims 15 and 29 under 35 U.S.C. §103(a) be withdrawn.

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**Regarding the rejection of Claims 16-28 and 30-42 over the Chang publication, in view of the Applicants' own admission**

Regarding Claims 16-28 and 30-42, the Applicants refer the Examiner to the paragraph immediately below.

5

**Dependent Claims**

Claims 2-14 are dependent upon Claim 1, Claims 16-28 are dependent upon Claim 15, and Claims 30-42 are dependent upon Claim 29. For at least the reasons given above, the Applicants submit that Claims 1, 15, and 29 are patentable over the cited prior art. Therefore, in addition to the reasons set forth above, the Applicants submit that Claims 2-14, 16-28, and 30-42 are also patentable over the cited prior art at least based on their dependence upon an allowable base claim.

10

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**Closing Remarks:**

The Applicants respectfully submit that, in light of the above remarks, the application and all pending claims are now in allowable condition. Therefore, reconsideration is respectfully requested. Accordingly, early allowance and issuance of this application is respectfully requested.

In the event that the Examiner wishes to discuss any aspect of this response, or believes that a conversation with either the Applicants or Applicants' representative would be beneficial the Examiner is encouraged to contact the undersigned at the telephone number indicated below.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 50-2691. In particular, if this response is not timely filed, the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 50-2691.

4/23/07  
\_\_\_\_\_  
Date

Respectfully submitted,

\_\_\_\_\_  
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